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# New reports of cyperaceous rust fungi from Pakistan

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Abstract —*Puccinia minuta* is reported as new record, and the telial stage of *P. caricis* is reported for the first time from Pakistan.

Key words — *Cyperaceae*, sedges, *Uredinales*

## Introduction

This paper is a continuation of the exploration of rust fungi on *Poaceae* and *Cyperaceae* from Pakistan. Previously, about 21 rust species have been reported on 15 hosts of *Cyperaceae* from Pakistan (Ahmad et al. 1997; Afshan & Khalid 2008; 2009; Afshan et al. 2009; Saba & Khalid 2011). In the present investigation, rusted specimens of *Cyperaceae* were collected from different localities in Pakistan. Among these, one rust is a new record for the country, and the telial stage of another is reported for the first time in Pakistan.

## Materials & methods

Rust infected plants were collected along with their inflorescences. These collections as well as herbarium specimens from were studied morphologically and free hand sections and scrape mounts were taken from infected plant materials. The plants were photographed and infected portions were observed under a stereomicroscope. Twenty spores of each spore state were examined under a microscope (Nikon YS 100); paraphyses and spores were measured through a Zeiss Eyepiece Screw micrometer. Sections, paraphyses, and spores were photographed using a Digiporo-Labomed. Illustrations of spores and paraphyses were made under a camera lucida (Ernst Leitz Wetzlar Germany).

## Species recorded

***Puccinia minuta*** Dietel, Cornell Univ. Sci. Bull. 3(1): 19 (1897) Fig. 1

Spermogonia and aecia not found. Uredinia adaxial, naked, light brown in color, 0.2–0.3 mm long. Urediniospores globose to subglobose, light brown to

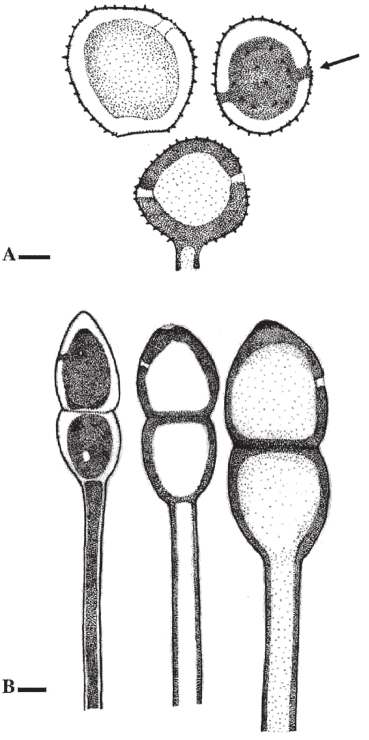


Fig. 1: *Puccinia minuta*.
A. Urediniospores showing germ pores (arrow); B. Teliospores.
Scale bars: A = 14µm; B = 12 µm.

hyaline, 23–29 × 24–30(–38) µm; wall 2–4 µm thick, echinulate; germ pores up to 4, equatorial. Telia amphigenous, subepidermal, brown, 0.1–0.4 × 0.1–0.3 mm. Teliospores amphigenous, oblong, brown to chestnut brown, 2-celled, (9–)14–24(–27) × (26–)42–56 µm, rounded above, narrowed below, apex 5–9 µm thick; wall 2–5 µm thick; pedicel long, hyaline, 5–9 × 30–66(–92) µm.

Material examined: **PAKISTAN**, **Khyber-Pakhtunkhawah** (KPK), Ghora gali, alt. 1950 m a.s.l., on *Carex* sp., stages II + III, April 2011, AM #7 (LAH 1135).

Comments: *Puccinia bolleyana* Sacc., *P. caricina* DC., *P. caricis-kouriyamensis* Morim., *P. caricis-pocilliformis* Morim., *P. dioicae* Magnus, *P. extensicola* var. *linosyridis-caricis* (E. Fisch.) Zwetko, *P. pakistani* S. Ahmad, *P. subepidermalis* Afshan et al., and *P. urticata* F. Kern have previously been reported on *Carex* spp. from Pakistan (Ahmad 1960, 1969; Ono 1992; Ono & Kakishima 1992; Afshan & Khalid 2009; Afshan et al. 2011; Saba & Khalid 2011). *Puccinia minuta* is a new record for the country.

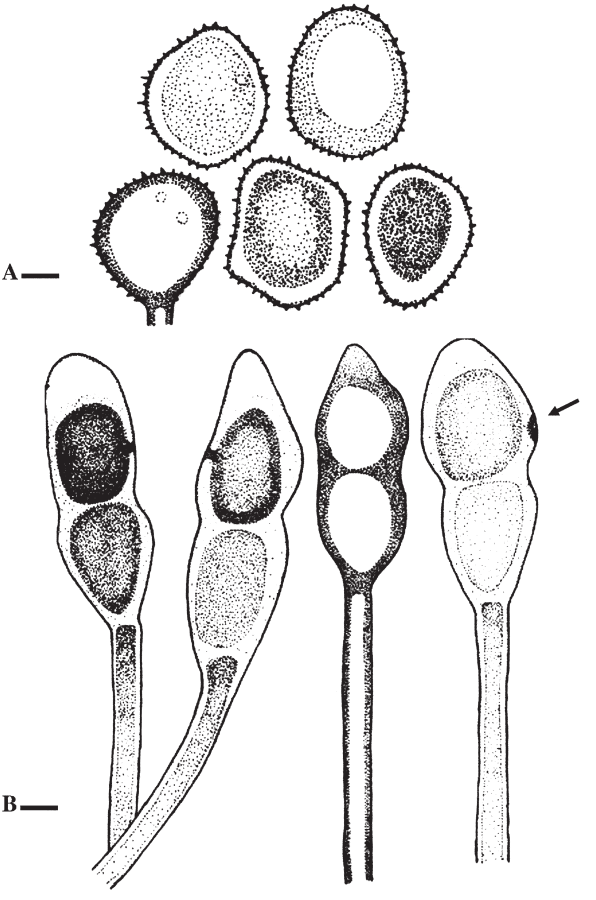


Fig. 2: *Puccinia caricis*.
A. Urediniospores showing germ pores (arrow); B. Teliospores.
Scale bars: A = 10 μm; B = 13 μm.

***Puccinia caricis*** Rebent., Prodr. Fl. Neomarch.: 356 (1804) Fig. 2

Spermogonia and aecia not found. Uredinia amphigenous, light brown, scattered, covered by epidermis, oblong, 0.1–0.2 × 0.07–0.1 mm. Urediniospores globose to subglobose, 14–19 × 18–23 μm; wall 2–3 μm thick, echinulate; germ pores up to 8, scattered. Telia hypophyllous, naked, black, 0.1–0.2 mm. Telia hypophyllous, naked, black, 0.1–0.2 mm. Teliospores clavate or oblong to clavate, chestnut-brown to hyaline, 16–26 × 47–68 μm; apex conical, 8–10 μm thick; 1.5–2 μm thick from sides; pedicels hyaline, persistent, up to 50 μm long.

Material examined: **PAKISTAN**, **Khyber-Pakhtunkhawah** (KPK), Ghora gali, alt. 1950 m a.s.l., on *Carex* sp., stage III, April, 2011, AM # 61 (LAH 1136).

Comments: The aecial stage of *Puccinia caricis* was previously reported from Patriata in Pakistan on leaves of *Urtica dioica* L. (Ahmad 1956a,b). The telial stage is reported here for the first time from the country.

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